Mediating Exposure in Public Interactions

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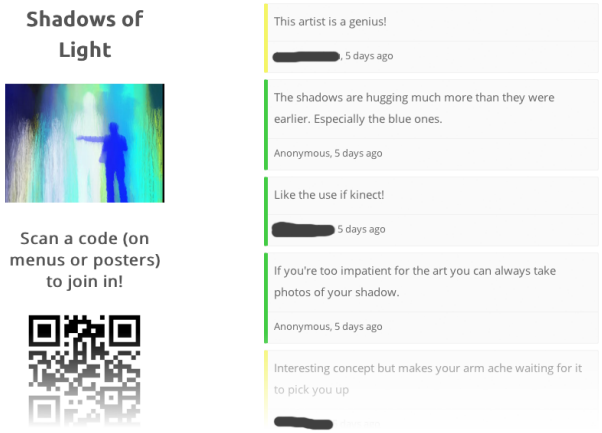

Figure 1: A sample of the public projected view.

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Abstract
Mobile computing and public interactions together open up a new range of challenges in interaction design. To date a very gregarious model of interaction has been assumed. However, the public setting will invoke feelings of shyness and a desire to control the personal exposure associated with interactions. In this paper we discuss these issues and our initial tests of a system which affords a control beyond "engage or don't engage".

Author Keywords
Mediating visibility, public interaction, commenting system

ACM Classification Keywords
H.5.2 [User Interfaces]; K.4.2 [Social Issues]

Introduction
Pervasive computing, both personal (especially mobile) and public – embedded in the world around us, has the potential to deliver many social benefits, through a more natural approach to computing which enables its benefits to be greater and more widely felt. However, this benefit requires more than universal access to data and computing devices – it requires significant social change. It is tempting to argue that pervasive computing must fit existing society without disruption or, conversely, that society should adapt to its surroundings. Instead, we

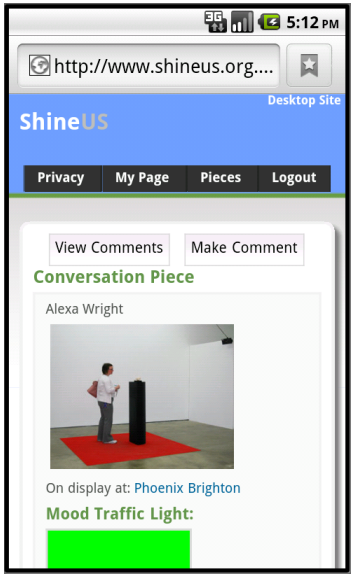

Figure 2: Example Screen from Mobile Version: Viewing Artefact

make a more complex argument: that while we may expect society to change, this change should be negotiated by the participants, each finding a place in which they are *comfortable*. If our new technology excludes parts of society or creates new barriers it has not been entirely successful.

In our recent work we have focussed on the issue of enabling participation through creating new, technological, comfort zones. In particular we are interested in information models and implementations that allow users to control presentation of self and mediate interactions, particularly in performative settings [1]. We are also interested in the sense of performance anxiety and shyness arising from the more immediate forms of interaction provided by pervasive computing. To do this we have explored modes of interaction which are not universally comfortable in applications which have the capacity to raise tensions through considering trust, comments, discussions, privacy and personal space. We then observe how the controls over comfort are used. We are not presenting the results of a large scale study here, but initial observations and prompts to the wider community to consider these issues.

Systems For Discussion

We have focussed on systems which allow discussion in the virtual to be connected with the physical world: commenting on what is around us. The idea of "giving feedback" online is well established and used, however the direct connection between a physical presence and that feedback is not. The in-situ nature presents some challenges:

- Hands are often busy with bags, drinks etc.
- When physically with others the discussion will often first be with those present rather than the wider world, although anecdotally we see many people using mobile devices when out with others.
- When others we know may be nearby, anonymity is reduced and creates a tension around appropriateness and feeling qualified to comment.
- Similarly, when the person whose work is being discussed is nearby, being seen to leave comments creates a social tension.

It is the concerns around being associated with what is said that we are interested in here. Can we provide sufficiently usable aids that allow users to prepare thoughts, and separate themselves from association with their comments? These questions of engagement and moderation of "public" are also raised in [2].

Our System

We have a system, "ShineUS", for supporting discussion of physical artefacts, which explores how *public* people want to be about what they say. This system has benefited from past experience in public deployments in markets [5]. We expected that mediation of discussion via the virtual would have several effects:

- It provides a natural delay in which thoughts can be framed, widening the circle of discussion to those less confident about synchronous interaction.
- It provides a level of anonymity which allows people to say things they might not say face to face.
- It provides a degree of permanence and visibility to a discussion which may affect the comfort of some users.
- The asynchrony may lead to interactions which would otherwise have been missed, due to time and space limits of the physical experience.

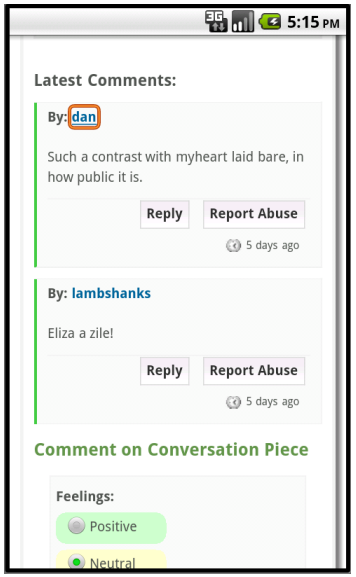

Figure 3: Example Screen from Mobile Version: Viewing Recent Comments

The system has a number of components:

1. A server, hosted at the University of Sussex, which provides web pages and stores all data.
2. QR codes placed by the artifacts, and also on "menus" elsewhere in the deployment environment.
3. A projector to provide a very public visualisation of the live comments.
4. Users' mobile devices, acting as code readers, comment input and comment reading devices. This provides a more personal visualisation of comments.
5. Project team members with tablet devices to explain and demonstrate the system.

The mobile version of the system is a mobile-friendly website, rather than an application – so can be run on a wide variety of devices with minimal setup complexity. Instructions were provided in the venue for loading a QR reader app for iPhone and Android devices. A typical use case would be:

1. Identify item to discuss by QR code or on web site
2. Register / login if the user hasn't done so before. There was a short questionnaire upon registering to gather demographic and confidence measures.
3. The user makes a comment, as shown in figures 2,3,4. The ability to reply supports discussion.
4. When confirming the post the user chooses visibility control settings, including show/hide nickname; send to nearby projector and on web / just show on web; delay appearance of comment; copy post to Twitter / Facebook account (if accounts linked).
5. The comments on the projector automatically cycle through recent public posts to the various tags to prompt people to look at what is being said and engage in the discussion. An example of a projection screen can be seen in figures 5,1.

The visibility controls are seeded with a default and the last settings are remembered, but each post has its own visibility settings allowing users to vary according to the post without affecting existing posts. The defaults are chosen round-robin from a limited set, giving a mix of default degrees of exposure.

Unlike many systems which focus on expressive power and how people arrange their lives in large scale social networks, e.g. [3], we are considering a system which has to be simple to understand and use through a smart phone and does not seek to be a means to describe yourself – but to describe thoughts in relation to objects under discussion, art in this case. However, the very public nature of the system and the use of nicknames, which for some users contained real names, does require some visibility control.

Deployment Lessons

We deployed the system at an art exhibition, part of "white night" [1] where it was presented as a system for discussing the art. The event was in the evening, lasting 7 hours, with 11 pieces of visual and performance art requiring a mix of interactive and observational engagement.

Google analytics reported 181 total unique visitors to the system during the night, of which 131 were via QR scans, 20 following Facebook or Twitter links and 1 following a web search. 26 users signed up, 21 of whom posted at least one comment. These numbers included 2 users

[1] http://www.whitenightnuitblanche.com/brighton/events/like-shadows-a-celebration-of-shyness/

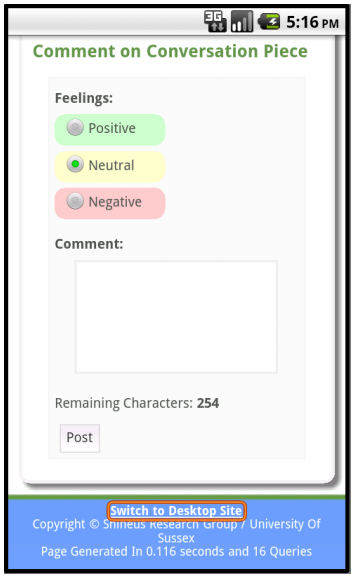

Figure 4: Example Screen from Mobile Version: Entering A Comment

involved in the study who seeded the discussions, illustrated the use of the system and, with the aid of tablets, provided advice to users who needed it. The seeding process allowed users to observe the system, rather than forcing participation. The "seeding" users and all their posts are excluded in the discussion below. Of the 19 participating users, the majority were between 25 and 40 years old and the male:female ratio was 2:1, just one user not specifying a reply to these questions. Anecdotally we observed that few users had QR readers already installed on their phones and we heard several comments like "I've seen these [QR codes] in magazines but never used them". While QR codes may be commonplace in the pervasive / internet of things research world, their use by the general public in the UK is not. Further, a few people noted that they didn't think their phones were up to the web browsing part of engagement.

A similar system was deployed at a computer science conference, as a system for commenting on posters and demonstrations, but despite greater familiarity with the technology was less heavily used: 9 users registered and 6 commented with a total of 7 comments.

Comments Made

Of the 30 comments made at the gallery, 17 are made about the three most talked about pieces, the rest prompting just 1, 2 or 3 comments. The time between each user's first and last comment was consistently less than an hour – which ties in with the flow of people through the venue, although comments were made throughout the evening.

The users were general public at an art event and had little sense of community or general connection to each other, and many would have been under the influence of alcohol. 14 of the users said that they felt at least reasonably confident about commenting on art and 12 rated themselves between 0 and 3 on a 1 to 10 scale of "how shy do you feel today". This context gave rise to a lack of concern about who read comments and we have observed that settings move towards more public comments – with only a few more sensitive comments made anonymously. This disconnection from the mass is also reflected in the lack of "replies", although 2 comments refer to a previous comment ("don't like to be a naysayer but..." and "lol") and 2 refer to other people present (e.g. "I don't think my boyfriend is ever going to leave this room..."). These interactive comments were made about pieces with fewer comments, not just the busy ones.

We saw a reluctance to engage with our system at the academic conference, which (having spoken to some participants informally) arises from a combination of two effects: First, that hands were often full – with a bags, drinks etc. Second, that in both cases the act of scanning the tag was much more visible to the stallholder or poster presenter than it was to the gallery artist, and that they were available for direct interaction. The virtual was both less necessary and socially awkward – not all interactions *need* a near-synchronous virtual counterpart.

Use of Visibility Controls

In the **art gallery** deployment, we saw 30 comments from 19 users. 11 comments were more public than the default (not anonymous and/or projected), 12 were default and public, 7 were default not public, and 1 was less public than the default. 2 people chose not to have their comments on the projector. In terms of delay, 12 were less than the default (although in one case this was reduced from 10 to 2 minutes), and 18 had default not delayed. Critical or personal comments do not seem to have been

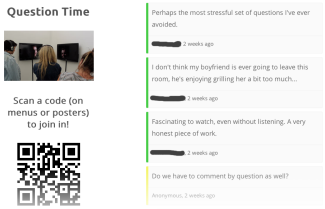

Figure 5: Example Projection Screens: Note use of like / neutral flags; reference to other people. Nicknames obscured.

treated differently from more positive comments.

At the **academic conference** we saw 7 comments from 6 users. 3 comments were more public than the default , 2 were default and public, 1 was default not public, and 1 was less public than the default. No one chose not to have their comment on the projector. In terms of delay, 4 comments were less delayed than the default, 2 default not delayed, and 1 was longer than the default. 2 comments might have been interpreted as mildly critial, one was anonymous by default but the delay was reduced the other changed from display name and zero delay to anonymous and 2 minutes delay.

So, in both cases the majority opted for a public and immediate presentation, but in both cases a few users wished to reduce their exposure either by greater anonymity, by avoiding the projector or by using some delay between input and display being public.

Discussion

In these deployments the general behaviour was not to make great use of visibility reducing facilities – but this behaviour was not exclusive. Some users chose to limit their exposure, either generally or for some posts. Other users, in verbal interaction, were clearly reluctant to engage, with some comments suggesting a fear of exposing their perceived incompetence with technology. The generally public mood reflects a combination of influences: the very transient nature of participation, despite the public interaction; the low level of personal data involved, particularly with the short-lived interactions. We might also speculate that the widespread use of social media by the participants and the night-time setting also made users relax about their exposure. Key to more substantial results will be longer duration and more widely used deployments or this or similar systems. This will enable understanding around asynchronous co-presence [4] to develop and social conventions of variable public exposure to develop .

Conclusions

Balancing real-world interactions and virtual interactions is far from seamless. Based on our sample, people's preferences in this regard do vary – between people, places and individual interactions. This variation can be extended to many settings and users – "we are all different". It would be interesting to explore this mediation of exposure through further systems deployments.

Acknowledgements

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